

New and Known Australian Sarcophagid Flies.

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(Text-figures 1 and 2.)

As far as we are aware the whole of the literature relating to known Australian Sarcophagidæ is referred to in our two papers (1921, 1922). In the present contribution we have described a new genus and several new species, and have added additional locality records for many previously known forms.

The present paper is based mainly on specimens contained in the collections of the Queensland Museum, Brisbane, the Government Entomologist of New South Wales (Mr. W. W. Froggatt), and Dr. E. W. Ferguson, Health Department, Sydney. To these two entomologists and to Mr. H. A. Longman, Director of the Queensland Museum, we tender our thanks for the opportunity to examine the material referred to. The collection of Mr. Froggatt consisted of named and unnamed flies from various parts of Australia, and through his generosity in placing it at our disposal we have been enabled to clear up some synonymy. The abbreviations Q.M., W.W.F., and E.W.F. are used in connection with locality records to indicate the three collections respectively.

Mr. H. Hacker of the Queensland Museum has kindly assisted us by re-examining, at our request, type material of some of our previously described species.

1. Sarcophagids Recorded from Australian Grasshoppers.

The following species have been recorded as having been bred from Australian Locustidæ, viz.:—

- (1) *Sarcophaga pachytyli* (Skuse) by Olliff (1891) and by Froggatt (1905) as infesting *Chortoicetes terminifera* (syn. *Pachytylus australis* Br.) from several localities in southern New South Wales:

- (2) "A closely allied (if not identical) species" from the same species of locust from Richmond, New South Wales (Froggatt, 1905);
- (3) *S. aurifrons* Macq. recorded by Froggatt (1905, 1907) as having been bred from the same species from Queanbeyan and Cooma, New South Wales;
- (4) *S. ædipoda* (Olliff) from *Chortoicetes terminifera*.

The first-named is more fully described in the present paper. An examination of Mr. Froggatt's collection shows that the specimens referred to under No. 2 belong to *S. peregrina*; while his material "*S. aurifrons*" from Queanbeyan belongs to *S. depressa*. In regard to No. 4, Olliff, in writing of the parasites of locusts, gave the name *Tachina ædipoda* to a species "larger and more brightly coloured" than Skuse's *Masicera pachytyli*. This is the only description, though Froggatt in 1907 referred to the fly as a *Sarcophaga*. As we have pointed out (1922, p. 176), the name has no standing. The single specimen in Mr. Froggatt's collection was examined by us. It is not a member of the Sarcophagidæ, but has the general appearance of the Tachinid *Exorista*, though the arista is more like that of a Muscid.

2. *Sarcophaga impatiens* Walker.

Tambourine Mountain (S.E. Queensland)—Q.M.; North Pine (near Brisbane), Tamworth—W.W.F.

3. *Sarcophaga gamma* J. and T.

Brisbane, Bribie Island, Blackall Range.

4. *Sarcophaga peregrina* R.D.

Blackall Range, Brisbane, bred from the butterfly *Euploca corinna*—Q.M. Sydney; Kuranda (North Queensland)—E.W.F. Localities near Sydney; Gatton (Queensland)—W.W.F. Also from the locust *Chortoicetes terminifera*, from Richmond, New South Wales: the label on the pin states that the larva entered the soil on 5th March, 1904, the fly emerging on 20th March.

We may note that *S. fuscicauda* Böttcher (Entomol. Mitteilungen 1 (6), 1912, p. 168, fig 5) from Formosa is a

synonym of *S. peregrina*, whose range is now known to include Houtman's *Abrolhos* (West Australia), Sydney, Brisbane, North Queensland, New Guinea, and Formosa. It will probably be found to occur in the East Indies and Philippines.

5. *Sarcophaga eta* J. and T.

A number of specimens bred from the beetle *Xylotrupes australicus* Thoms., Brisbane—Q.M. There is no indication as to whether they were parasitic or merely scavengers, but were probably the latter, as we have bred the species from carrion.

6. *Sarcophaga aurifrons* Macq.

Amongst Mr. Froggatt's material bearing the above name were representatives of the following species:—*S. depressa*, *S. froggatti*, *S. peregrina*, *S. miscra*, and *S. impatiens*.

7. *Sarcophaga froggatti* Taylor.

Geraldton (Western Australia); Tamworth, Merriwa, Moree (New South Wales)—W.W.F. Also a specimen collected at Darwin, Northern Territory, by Mr. G. F. Hill and forwarded to Mr. Froggatt as *S. carnaria*.

Graham-Smith in his book on "Flies and Disease—non-bloodsucking Flies" (Edit. 2, 1914, p. 35) stated that *S. carnaria* was widespread and commonly occurred in England and Australia, and was not infrequently found in houses. We do not know on what authority the statement was made regarding its presence in Australia. We have not yet recognised it. It is quite possible that some fly similar in general appearance has been mistaken for it.

8. *Sarcophaga zeta* J. and T.

Bulli (New South Wales)—W.W.F.

9. *Sarcophaga depressa* R.D.

Geraldton and Mount Magnet (Western Australia); Sydney, Warrah, Coonamble, Yarrowin, Queanbeyan, Merriwa, Lower Hawkesbury River (all New South Wales localities); Gatton (Queensland)—W.W.F. Blackheath (New South Wales)—W.E.F. This is apparently the species usually referred to in Mr. Froggatt's papers as *S. aurifrons*, the two forms being closely related.

10. *Sarcophaga littoralis* J. and T.

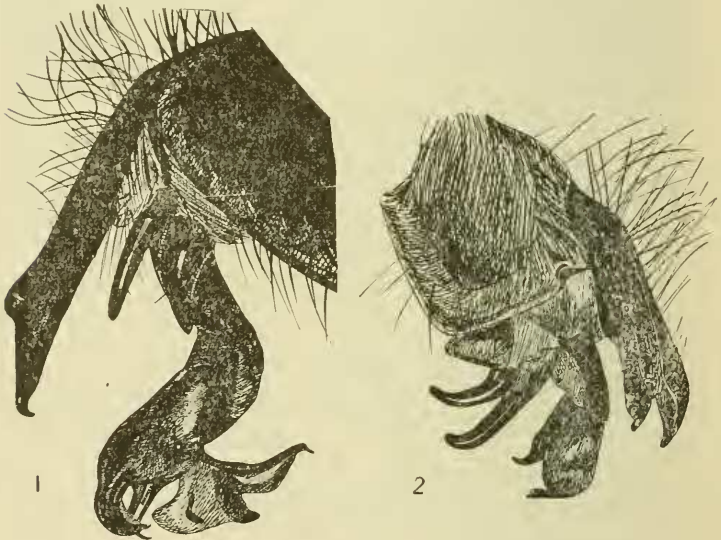
There is a specimen of this recently described species in the collection of the Queensland Museum. Locality, Tweed Heads.

11. *Sarcophaga brunneopalpis* n sp.

(Text fig. 1.)

Male.

In general appearance a medium-sized fly, greyish and faintly golden in colour, with the usual black markings and measuring about 11 mm. in length. The species closely resembles *S. gamma*.



Head.—Frons not very prominent; about three-fifths the width of eye. Frontal stripe very broad, being half as wide again as parafrontals. Eyes a little over three-fifths the height of head. Parafrontals, occiput, genæ, and meso-facial plate faintly tinged with gold.

First antennal joint not very conspicuous; second fairly large and tipped with brown, third about twice the length of second. Ptilinal suture remains fairly distinct throughout life. Proboscis a deep chocolate brown, marked with black, clothed scantily with golden hairs terminally and with black hairs proximally. Palps, epistome and oral

margin brown. Vibrissæ inserted rather close to oral margin and considerably weaker than usual. Eight epis-tomials, and about ten facials present. A row of ten frontals beside frontal stripe; verticals well developed; lateral verticals weak. A single row of black bristles behind eyes; occiput clothed with short pale golden hairs, becoming longer below and then shortening again on the anterior part of the genæ which also bears a small number of rather short black bristles.

Thorax about a wide as head, ashy coloured and faintly tinged with gold, with the usual three longitudinal black lines, of which the middle one alone extends definitely on to scutellum: sides of thorax distinctly tinged with gold. Anterior spiracle clad with pale brown hairs. Of the anterior acrostichals only the posterior pair is distinctly differentiated: of the posterior set, only the prescutellars are present. Three humerals; three intra-alars; dorso-central row complete. Apical scutellars present.

Legs black; femora, especially the first, faintly tinged with gold. First femur and tibia not distinctly hairy. Second femur hairy on proximo-ventral two-thirds; distally a "comb" is developed. Third femur hairy, but not very heavily; tibia hairless.

Abdomen clothed dorsally with short black reclinate bristles, but ventrally it is much less hairy than usual. Hypopygium nearly black, hairy. Foreeeps very dark brown; the proximal halves approximated and very hairy; the terminal third bare, slightly curved, pointed and with a hump which is obvious when the organ is seen in lateral view. Claspers brown. The penis is not unlike that of *Sarcophaga gamma* in shape; first joint whitish, with black markings posteriorly; second light brown and black, provided with several hooks and processes (fig. 1), some white, others brown in colour.

Described from one male captured by Mr. H. Hacker in Brisbane, December, 1917.

Type in Queensland Museum.

12. *Sarcophaga Fergusoni* n. sp.

(Text fig. 2.)

In general appearance a large broad golden insect, measuring 14 mm. in length.

Male.

Head rather broad, measuring $3\frac{1}{2}$ mm. across the eyes. Height of eyes about two-thirds that of head. Front slightly over half the width of eye. Frontal stripe black, tinged with reddish brown, and measuring about twice the width of each parafrontal. Eyes red brown. Parafrontals dark golden, almost brown; occiput and genæ a beautiful brown colour. First antennal joint clearly visible, though not very large; second large, conical, nearly black; third about thrice the length of second, a brilliant brown colour, and tinged on outer border with black. Ptilinal suture lodged in a distinct depression completely surrounding the mesofacial plates and broadening out laterally, where it is coloured black. Mesofacial plate brown, with very short silvery pubescence and with borders tinged with black. About fourteen facial bristles present; vibrissæ not very large. Thirteen epistomials present. Palps a brilliant brown. Bristles on occiput golden, those clothing anterior part of genæ black. Two rows of black bristles behind eyes, of which the first is very regular, the second irregular. Verticals present; lateral verticals absent. A row of ten frontals beside frontal stripe.

Thorax about 4 mm. broad, golden, with the usual three black longitudinal stripes. Of these the middle stripe differs from that of all known Australian species in being exceedingly narrow; on either side of it occurs another longitudinal stripe rather more distinct than usual. The last two pairs of anterior acrostichals are slightly differentiated; of the posterior set, only the prescutellar pair is well developed; dorsocentral row complete; three humerals present. There is an indication of a third intra-alar.

Legs black. First femur tinged very faintly with grey, hairless; tibia slightly shorter than femur, also devoid of hair; tarsus slightly larger than tibia. Second leg hairless; femur devoid of a distinct comb. Third femur hairless; tibia hairy on its distal ventral half.

Abdomen relatively broader than usual and with usual markings; dorsal black line extends on to last segment, where it is trifurcated. Hypopygium nearly black and exceedingly small. Forceps rather straight, swollen distally and slightly hooked at termination; proximal half clothed rather scantily with a growth of long black hairs. Accessory plates not very prominent, dark brown; elaspers black, simple. Penis heavily chitinised, quite black, and of a rather simple type. (Fig. 2.)

Described from a single male, collected by Dr. E. W. Ferguson, at Ecclestone, Allyn River (Patterson River district), N.S.W. Type deposited in Australian Museum.

LOCUSTIVORA n. gen.

13. *L. pachytyli* Skuse.

Syus: *Masicera pachytyli* Skuse, in Olliff, Agric. Gazette, N.S.W., 1891, p. 251.

Sarcophaga pachytyli Coquillet, Insect Life, 5, 1892, p. 22.

Sarcophaga pachytyli Froggatt, Agric. Gaz., N.S.W., 16, 1905, p. 20.

Sarcophaga pachytyli Froggatt, Australian Insects, 1907, p. 315.

Sarcophaga pachytyli Johnston and Tiegs, Rec. Austr. Mus. 13 (5), 1922, p. 175.

In general appearance a rather small grey fly, $4\frac{1}{2}$ to 5 mm. in length. Skuse stated that the length of the male was two lines (about 4 mm.) and the female 3 lines (about 6 mm.).

Male.

Head.—Front fairly prominent; eyes nearly four-fifths the height of head and about four and a-half times as wide as frons. Frontal stripe pale chocolate brown, nearly six times the width of parafrontals. The latter, together with the genæ and occiput, silvery, with dark reflections. Anterior portion of genæ tinged with brown. First antennal segment more conspicuous than usual; second large, brown with very faint silvery pubescence; third segment about one-third as long again as second, rather darker and with a more marked pubescence. Arista rather

longer than the three antennal joints combined; proximal third plumose. Mesofacial plates brownish, showing through the silvery pubescence. Ptilinal suture fairly distinct. Vibrissæ strong. Four facials, the upper very small. Four epistomials. Bristles on anterior part of genæ black, exceedingly well developed; succeeding bristles brown; those on lower part of occiput silvery. A single row of black bristles behind eyes; below these bristles are others irregularly arranged. A single row of ten frontals beside frontal stripe. Verticals fairly well developed. Lateral verticals present. Proboscis dark brown, palps paler brown.

Thorax considerably narrower than head. Colour a rather silvery grey, with three longitudinal lines of a brown or black colour, the median one extending farthest back and alone reaching the scutellum. The two accessory median stripes more than usually distinct. Sides and ventral surface grey. Apical scutellars very well developed. Dorsocentral row of bristles complete; anterior ones rather larger than usual. Three intra-alars. Four humerals, of which the upper is very weak, the second even weaker, the lower two strong. The last three pairs of posterior acrostichals, so far as can be made out in the material available, are present. A row of five sternopleurals above the coxa of third leg. Anterior spiracle rather small, covered with brown hairs.

Legs brown and quite devoid of hairs. The bristle rows of first femur well developed. Besides the microchaeta the second femur possesses only a few strong bristles, especially at its extremity; "comb" absent. On the third femur the microchaeta are equally poorly developed. The third tibia is provided with a number of abnormally large spines.

Wings.—Cell 5R almost closed. Medio-cubital nervure almost reaching margin of wing. Alulae and wings hyaline and quite transparent. Costal nervure spiny as usual; of the others on γ proximal part of vein R 4 + 5 hairy.

Since the abdomen is not present in the male material available, nothing can as yet be said about the male copulatory organs.

Female.

This differs from the male in the following respects:— Frontal stripe about as wide as parafrontals. A row of eight frontals beside frontal stripe, three others outside these and converging upon them above. Thorax as in male; apical scutellars absent; scutellum not so elongated as in male and possessing an almost semicircular shape. Abdomen clothed with short black reclinate bristles and a few large ones above; hairless ventrally. General colour silvery, the black markings very restricted and indistinct. Dorsal median black stripe practically absent.

Described from five imperfect specimens obtained from "plague locusts" (*Pachytylus australis* Br. = *Chortoicetes terminifera* Walker) from the following localities in New South Wales:—Whitton, Wagga, Cooma, Corowa. (Skuse, Olliff, and Froggatt material.)

The species was briefly described by Skuse in 1891 in an article by Olliff (*Agric. Gaz., N.S.W., 1891*), who added figures of the entire fly, the antenna and puparium. It was subsequently stated by Coquillet (1892) and by W. W. Froggatt (1907) to be a *Sarcophaga*. To the latter author we are much indebted for the opportunity to examine Skuse's type material (from Wagga and Corowa) which is in his possession.

The characters of the species, as given in the above description, show that it cannot be placed in the genus *Sarcophaga*. We have not been able to assign it to any of the other genera belonging to the family Sarcophagidae. We have accordingly erected for its reception the new genus *Locustivora* whose characters may be defined as follows:—

A small, but fairly robust dark grey and black species. Thorax with the usual three longitudinal lines; the accessory median lines more than usually distinct. Front in male very narrow, eyes nearly four-fifths the height of head; but in the female the frons is considerably wider than in the male. Third antennal segment only a little longer than second. Arista plumose on proximal third only. Epistomials and facials few in number. A single row of weak parafrontal bristles. Legs devoid of hair, but moderately well supplied with bristles. Cell 5R of wing almost closed. Only vein R 4 + 5 hairy. Abdomen hairless. Type, *L. pachytyli* (Skuse).

Type specimens in collection of the Government Entomologist (W. W. Froggatt), Sydney.

W. B. Gurney (Agric. Gazette, N.S.W., 1908, p. 415) mentioned having found the fly in its larval stage parasitising locusts at Tocal, near West Maitland.

When referring to the species, Mr. Froggatt (1905, p. 20) stated that two specimens of a closely allied, if not identical, species were bred from *Chortoicetes terminifera*, taken at Richmond, N.S.W. These flies were examined by us and found to be *S. peregrina*.

LITERATURE.

- 1921.—JOHNSTON, T. H., and TIEGS, O. W. "New and little known Sarcophagid Flies from South-eastern Queensland," Proc. Roy. Soc. Q'land, 33 (4), pp. 46-90.
- 1922.—JOHNSTON, T. H., and TIEGS, O. W. "Sarcophagid Flies in the Australian Museum Collection." Rec. Austrn. Mus. 13 (5), p. 175-188.